

ANNUAL INDEX, 1959

VOLUME 40

GUIDE TO PAGE NUMBERS: January, 1-38; February, 39-78; March, 79-114; April, 115-150; May, 151-190; June, 191-232; July, 233-258; August, 259-298; September, 299-342; October, 343-378; November, 379-414; December, 415-450

ABSORPTION:

graphite heat exchangers in, 128
phenomena, agitation studies, 43
tray, *Flexitray*, 399
X-ray, 225

Acetylene from hydrocarbons, 102, 166

Acid:

handling, remote control, 399
neutralisation, 196
neutralisation, automatic control, 198-199
tanks, repair plate, 142

Acrylonitrile, 148

Activated carbon, 70

Air:

conditioner, *Rigidex*, 326
drier, 323
drying, cooling, cleaning, 253
films, convection and radiation coefficients for, 33
filter:
panel, 252
regulator, 401
pollution:
analysis, 326
Chief Alkali Inspector's report, 233
oil refinery, 2
velocity indicators, 400

Albright & Wilson chemical activities, 226

Alumina:

activated, 37
plant, U.S.A., 103

Aluminium:

alloys, electrolytic oxidation of, 150
fabrication in New Zealand, 186
Tasmanian project, 377

Ammonia:

crackers, 401
from pickle liquor, 81
Shell Haven factory, 247
synthesis gas plant, 413

Ammoniacal liquor, concentrated, 319

Ammonium nitrate factory, 247

Ammonium sulphate, manufacture through

flue-gas desulphurisation, 382

Analysis, chemical, automatic, 373

Angle, anti-corrosion, 179

Anhydrite mine, 248

Anode, anti-corrosion, 180

Antibiotics:

continuous fermentation, 1
penicillin research discovery, 118
pilot plants, 409

Arc torch, plasma (U.S.A.), 183

Atomic energy:

Australia, 327-329
Australian-Canadian agreement, 411
Canadian programme, criticism, 380
chemical engineering in, 259
China, progress in, 397-398
closed-circuit television experiments, 369

Atomic energy (contd.):

criticality accident, U.S.A., 279-281
dangerous materials handling, 312
Dominican Republic, 377
evaporator for radioactive waste, 432
fixation of fission product wastes, 263-267

fuel:

elements, problems, 343
separation apparatus, 369
instrumentation system, 326
irradiation cell, 437
Jason training and research reactor, 369
Krypton, clathrate of, 301
level gauge for water-moderated reactors, 382
O.E.E.C. convention, 341
plutonium separation, 271-273
power projects:

Bradwell, progress at, 394
Hinkley, civil engineering, 146
Japan, 184
Poland, 148
Sweden, 377
U.S.S.R., 378

proton synchrotron, 432

radiation processing plant, 362

radiation shielding window, 433

radioactive waste disposal, 233, 432

remote-controlled manipulator, 369

select committee on estimates, U.K., 299

Swedish plans, 411

thermonuclear research, 438

tracers test air-filter efficiency, 369

U.K.A.E.A.:

annual report, 260

organisation, 167

uranium plant, Springfield, 39

U.S. programme, dissatisfaction with, 380

U.S. nuclear fuel reprocessing plant, 411

reactors:

gas-cooled, U.S. power project, 335

German experimental unit, 344

Halden, Norway, 387

Hero project, 107

Italian, research, 432

Nestor, 432

plutonium recycle, 433

Zenith zero-energy gas-cooled, 289

sodium as reactor coolant, 347-351

Australia:

atomic energy in, 327-329

Canadian atomic energy agreement, 411

chemical investment in, 64

petroleum chemicals, 79, 149

petroleum industry, 79

Automatic control:

acid handling, 399
cellulose factory, 165
cement manufacture, 102
coke-oven plant, 317-319
complexity of, 192
distillation, panel on, 212
electronic, of chemical processes, 155-158
fractionation columns, 209
gas flow measurement, 399
hydrogen production, 167
hydrogen peroxide plant, 6
oil refinery control panel, 418
paper stock preparation, 166
pneumatic, 162-164
pneumatic system, *Mini-Line*, 402
valve control, electronic, 322
voltage, 194

Autoxidation, 5

BARREL dispenser, automatic, 110

Bars, hollow-bored, 179

Bearings, plastic, 109

Beer fermentation, 1

Bellows for expansion joints, 138

Beneficiation processes, 344

Benzole:

from coke-oven gas, 288
higher grades of, 57
Lincolnshire refinery, 345
recovery plant, Murton, 318

Beryllium, Australian atomic energy research, 328

Biochemical engineering, 1

Bitumen:

coal-gas process, Hungary, 77
emulsions, 57

Blast-furnace gas cleaning plant, 413

Boiler, carbon monoxide, 101

BOOKS REVIEWED:

'Analysis of Pipe Structures for Flexibility,' by Gascoyne, 291

'Atomic Energy in the Communist Bloc,' by Modelski, 434

'Chemical Engineering Data Book,' by Freshwater and Ross, 15

'Chemical Engineering Practice,' by Cremer and Davies, 291

'Chemical Process Economics,' by Happel, 291

'Chemical Processing of Nuclear Fuels,' by Martin and Miles, 291

'Electrolytic Manufacture of Chemicals from Salt,' by Hardie, 434

'An Introduction to Chemical Engineering,' by Littlejohn and Meehan, 339

'An Introduction to Chemical Nomenclature,' by Cahn, 434

'Metal Fatigue,' 339

BOOKS REVIEWED (contd.):

- 'Modern Chemical Processes,' Vol. 5, 339
- 'Plastic Sheet Forming,' by Butzko, 78
- 'Printing Ink Technology,' by Apps, 339
- 'Science in Industry,' by Carter and Williams, 434
- 'Yadernye Reactory' (Nuclear Reactors), by Galavanov, 339
- Boron trichloride, process agreement, 35
- Brazilian chemical industry, 261
- Brazing alloys, cobalt-containing, 150
- Brine, Pakistan deposits, 231
- British Chemical Plant Manufacturers Association, annual dinner, 379, 386
- British Iron and Steel Research Association, annual report, 234
- Brushes, plastic, 109
- Bulgarian chemical industry, 1
- Bulk meter, 403
- Bunkers, easier discharge of, 251, 300
- Butadiene production, 20

CALCIUM carbide:

- Israel factory, 148
- New Zealand plans, 71-73, 152
- Canada:
 - atomic energy programme, 380
 - chemical and engineering research, 153
 - heavy chemicals industry, 395
- Carbonaceous material, gasification of, 114
- Carbon black:
 - dispersion of, 55
 - Netherlands project, 35
- Carbon dioxide in protective atmospheres, 390
- Carbon disulphide from exhaust gases, 287
- Carboys:
 - new, 275
 - pack, plywood, 28
 - tilting stand, 65
- Catalyst:
 - ammonia cracking, 401
 - carrier for hydrogenation, 189
 - carrier for recovery of precious metal catalysts, 286
 - regeneration, 37
 - for tail-gas treatment, 42
- Catalytic processes, apparatus for, 74
- Cathodic protection, platinised titanium anodes, 403
- Caustic soda from sodium sulphite liquor, 268-270
- Cellulose factory, automatic control, 165
- Cement:
 - chemical-resisting, 113
 - factory, automatic control, 102
 - slurry filtration, 299
- Centrifuging:
 - developments, review, 86-90
 - laboratory, 87
 - new machines, 323
 - particle size analysis, 385
 - self-opening purifier/clarifier, 138
 - test-tubes, 325
- Ceramics:
 - coatings, 25
 - electricity from, 40
- Chain pulley blocks, 253
- Chemical analysis, automatic, 373
- Chemical engineering:
 - atomic energy and, 259
 - development, organisation of, 237-238
 - know-how, plant manufacturers and, 379
 - profession, strength of U.K., 151
 - research, U.K. survey extended, 343
 - training, scheme for, 261
- Chemical industry:
 - Chief Alkali Inspector's report, 233
 - co-operation with plant manufacturers, 386

Chemical industry (contd.):

- European centre, 210
- exports, Mr. S. P. Chambers on, 115
- Chemical plant:
 - British trade in, 192
 - costs, see 'Cost Estimating'
 - delivery dates, 191
 - industry and 'know-how,' 379, 386
 - planning and erection of, 355-362
 - U.S., new, 438
- Chemische Werke Hüls, 166
- Chemists, qualifications in U.K., 381
- Chemistry research, British, 427
- China, chemicals and fertilisers, 341
- Chlorine:
 - recovery, 12
 - South African factory expansion, 35
 - U.S. project, 257
- Chocolate, ultrasonic treatment, 56
- Chromatographic materials, 65
- Citric acid from molasses, 153
- Coal:
 - fluorocarbons from, 79
 - oils and chemicals from, 245
 - separation from minerals, 219
 - tar, distillation, Canadian industry, 395
 - tar-epoxy coating, 284
- Coatings:
 - epoxy-based, *Araldite*, 70
 - epoxy-based, *Epiglo C*, 29
 - liquid, 221
 - polythene, 142
 - protective, 113
 - rubber, brush-applied, 29
 - solvent-resistant, 181
 - synthetic-rubber, 113
- Coke-oven plant, Murton, 317-319
- Cold junction box, 28
- Colours, synthetic, manufacture of, 301
- Comminuting machine, 180
- Compressors, 140
- Computers:
 - analogue, 286
 - chemical process design, 6, 58-62
 - complexity of developments, 192
 - distillation calculations, 207
 - heat flow measurement, 96
 - plant simulation, 161
- Condenser, glass-fibre, 141
- Conductivity, measuring, 179
- Containers:
 - pressure, 179
 - Portolite* flexible, 27
 - Fibreglass*, 113
- Control, for metering pump, 219
- Conveyors:
 - brush unit, 29
 - gravity, *Glidewheels*, 31
- Coolant emulsions, 56
- Cooling towers:
 - development, 138
 - gantry for maintenance, 323
 - packaged, 401
- Cooling plants for liquids, 31
- Copper refining, Australia, 411
- Corrosion:
 - (See also 'Metals,' 'Coatings,' 'Cathodic protection,' etc.)
 - cost of, 40, 214
 - Exhibition, 118, 215-217
 - inhibitor, vapour-phase, 216
 - Meehanite* metal, 130
 - packaging of chemicals, 274-276
 - lighting fittings, 4
 - research, Canadian, 154
 - research, U.K., 217, 427
 - resistant cements, 216
 - sodium in nuclear reactors, 350
 - stress corrosion research, 225
 - zirconium, 363
- COST ESTIMATING:
 - capital costs, 175
 - chemical plant indices, given monthly electricity, 431
 - engineering costs, 345

COST ESTIMATING (contd.):

- pro-forma, 177
- Coupling:
 - electromagnetic, 26
 - self-sealing, 180
- Counter, electro-magnetic, 111
- Crack detector, 182
- Creams, pharmaceutical, etc., 56
- Creep:
 - data centre, 296
 - zirconium, 366
- Crushers and grinders, see 'Size Reduction'
- Cyanide:
 - in plating-shop effluent, 200
 - treatment, automatic, 201
 - treatment, research, 203

DEVELOPMENT section, organisation of, 237-238

- Dispenser, liquid, 180
- Distillation:
 - apparatus, automatic, 143
 - fractional, developments reviewed, 168-171, 207-210
 - frothing, prevention of, 37
 - grid-packed towers, 3
 - high-vacuum unit, 436
 - hydrogen peroxide, 6
 - panel's report, 187, 211-213
 - tar, Canadian plant, 239
 - tower packings:
 - Goodloe, 309
 - Intalox*, 310-311
 - random packings, efficiency, 303-305
 - selection of, 306-309
 - Tellerette*, 305
 - types of (chart), facing page 306
 - tray, *Flexitray*, 399
 - tray, *Glitsch*, 251
 - unit, 113
- Dolomite milk in effluent neutralisation, 41
- Drums:
 - all-metal, 277
 - for chemicals, 274
 - lifting device, 112
 - opener, 285
 - polythene-lined, 277
 - printing on, 152
 - strengthened, 375
 - tap, 326
- Drying:
 - air and gases, 323
 - conveyor drier for rubber, 205-206
 - developments reviewed, 391-394
 - drier-pulveriser, 48
 - fish, 262
 - flash, 65
 - packaged rotary-louvre driers, 110
 - paper-chromatography oven, 70
 - pulp, 416
 - oven, close-control, 69
 - solid-desiccant driers, 138
 - tunnel kiln, 332
- Dust:
 - concentration measurer, 375
 - control, 324
 - See also 'Gas Cleaning'
- Dyestuffs plant, India, 257
- EFFLUENT treatment:
 - See also 'Air pollution,' 'Gas cleaning'
 - anaerobic digestion, 204
 - automatic control of neutralisation, 198-199
 - automatic neutralisation, 41
 - biological, research on, 203
 - chromium-plating liquors, 200
 - cyanide:
 - automatic treatment, 201
 - control of chemicals, 203
 - disposal, 200
 - equipment range, 284

Effluent treatment (contd.):

- gaseous effluent in fertiliser works, 10
- ion-exchange, 201, 353
- metal-finishing wastes, 200
- methods reviewed, 200-201
- planning for, 195-197
- radioactive, Winfrith Heath plant, 290
- tannery wastes, 204

Effluents, pipes for, 202, 402, 312 (correspondence)

Electricity:

- chemical works, 428 431
- generation, chemical works, 428
- geothermal, 416
- lighting fittings, 4
- motors, 26, 430
- rectifiers, 290, 428
- thermo-electric ceramics, 40

Electrolysis anodes, platinised titanium, 41

Electrolytic conductivity controller, 31

Electron accelerator, 375

Electrostatic:

- particle size analysis, 384
- precipitation, new fields for, 226

Elevator, screw-conveyor-type, 219

Elutriation in particle size analysis, 384

Embrittlement in metals, research, 346

Engineering, Marine, Welding and Nuclear Energy Exhibition, review, 137-140

Epoxy resins, 216

Essential oil emulsions, 56

Etching troughs, acid-resistant, 109

Ethylene:

- from light hydrocarbons, 102
- I.C.I.'s Wilton plant, 343
- oxidation of, 153
- production, 19

Ethylene oxide:

- production, automatic control, 166
- projects, 224

Evaporator, plate-type, 141

Exhibition stands, 116

Expansion joints, circular, rubber, 141

Explosion protection, 38-85, 137

Explosives:

- Canadian production, 396
- cartridge machine, 186
- nitroglycerine production, 90
- safer manufacture of, 22-23

Extractors, packing, 141

FANS, industrial:

- corrosive fumes, 32, 220
- paddle-bladed, 435
- plastic, 319
- wooden, 302

Fat liquors, 56

Fats, melting out in drums, 92

Fatty acids plant, new, 34

Felt, resinated, 285

Fermentation, continuous, 1

Fertilisers:

- ammonia, Shell Haven factory, 247
- ammonium nitrate factory, 247
- ammonium sulphate from flue gas desulphurisation products, 382
- automatic proportioning, 24
- Canadian company, new, 334
- Canadian production, 396
- Fisons Group annual review, 413
- granular, new I.C.I. plant, 248
- granulation plant effluents, 10
- Irish projects, 382
- Israel expansion, 144, 379
- Spanish plant, 411
- processes agreement, 101
- research, U.S.A., 337
- Rhodesian projects, 148
- urea project, India, 413
- urea project, U.S.A., 333-334

Filters:

- acids, 179
- air, 109
- automatic, 69

Filters (contd.):

- cement slurry, 299
- fibre, for acid spray, 253
- presses, 324, 150
- self-cleaning, oil, 138

Fire hose, 183

Fish-drying plant, 262

Fishmeal plant, centrifuge, 89

Flakers, 183

Flanges, forged alloy, 112

Float trap, 137

Flow control:

- flowmeters:
 - double-bellows, 97
 - electric, 375
 - heat, 96
 - low-rate, 375
 - magnetic, 96
 - review of developments, 93
- Rotameters with electric transmission, 96
- taperless-tube Rotameter, 154
- variable-area, 94-95
- gas flow measurement, 399
- inducer, 142
- integrator, 286
- liquid flow indicator, 286
- photo-electric alarm, 285
- rate calibrator, 98
- recorders, 98
- self-acting controller, 99-101
- transmitter, electronic, 435

Fluid displacement in porous masses, 194

Fluidised-bed:

- control of, 417
- cooling of ingot moulds, 381
- techniques, research and development, 335
- uranium processing development, 173

Fluorine:

- compounds, discharges of, 12
- resins, 126

Fluorocarbons from coal, 79

Foams, polyurethane, 111

Fork trucks, 68

Foundry moulds and cores, self-binding agents for, 150

Fractionation, see 'Distillation'

Fuel oil additive, 183

Fume exhaust, see 'Fans, industrial'

Funnels, plastic, 435

Furnaces:

- electron-stream, 442
- end plates, 326
- muffle, 66

Fusion kettle, 114

GAS absorption, agitation research, 43

Gas:

- appliances, lightweight (U.S.A.), 183
- chromatographic analysis, 286
- cleaning:

- blast furnace effluent, 196, 413
- cyclone, 374
- dust collectors, 373, 221
- electrostatic precipitators, 13
- impact scrubber, high-velocity, 13
- iron oxide fume, 234
- methods reviewed, 11-12
- multi-wash system, 138
- nitrogen oxides, 42
- organic sulphur removal, 150
- silica fume, 13
- venturi scrubber, multiple-tube, 8-10
- washer-precipitator, 13
- coke-oven and by-products plant, Murton, 317-319
- compressed, Canadian production, 395
- concentration measurer, 375
- desulphurising plant, 414
- diffusion analysis, 326
- drier, 323
- exhaust, carbon disulphide from, 287

Gas (contd.):

- flow measurement, 97, 399
- holders, British, for India, 413
- Hungarian coal-gas process, new, 77
- inert, preparation and uses, 388-390
- in tubes, heating and cooling (nomogram), 407
- liquid, mechanical power from, 116
- liquefaction of, 37
- radio-assay, 287
- reforming:
 - Romford plant, 193, 227
 - Dutch project, 413
- regulators, 68
- vibrations caused by compressed, damper for, 285

Gas-liquor road transport, 302

Gear, variable speed, 137, 138, 436

Gelatine, ion-exchange production, 3

Geothermal power, 416

Germany, nitrogen industry, 106

Glass:

- 'float' process, 153
- glassed-steel chemical plant, 216
- laboratory sets, 25, 285
- lining of chemical plant, 82
- melting, control of, 160
- tube cutter, 401

Glass-fibre, bonding to vinyl sheet, 324

Glover, John, 2

Goggles, plastic, 67

Graphite:

- absorber, 330
- centrifugal pump, 286
- heat exchangers, 127-129, 204

Grease:

- high-temperature ovens, 221
- softening mill, 67

Grinders, see 'Size Reduction'

HEAT:

- and heat flow measurements, 158
- exchangers:
 - glass condenser, 27
 - graphite, 25, 30, 127-129, 204
 - U.S. standards plan, 193
- transfer:
 - See also 'Nomograms'
 - aluminium sheet, 66
 - dropwise condensation promoters, 117
 - liquid hydrogen as coolant, 299
 - medium, Thermex, 437
 - rate functions in distillation, 208

Heated tilting pans, 48

Heating:

- cable, flexible, 30
- coils, titanium, 28
- driers, four-zone, 219
- plants, automatic, 26

Heavy organic chemicals, 151

Heavy water, U.K. process, 16-18

Hectorite, beneficiated, 32

Helium in low-temperature research, 297

Hemicellulose degradation, 346

High-temperature composition, silicon nitride, 381

Honduras industrial projects, 35

Hopper:

- attachment, vibratory, 111
- replenishment, electric control, 325

Hose:

- flexible, 324
- for corrosive materials, 286
- rayon yarn reinforced, 436

Hungary:

- chemical and fertiliser projects, 35, 231
- chemical industry, accident rate, 257
- chemical industry, five-year plan, 411

Hydraulic motor, slow-speed, 436

Hydrogen:

- liquid as coolant, 299
- plant for peroxide manufacture, 5

Hydrogen chloride recovery, 11

Hydrogen peroxide plant, 5-7
Hydrogen sulphide recovery, 12
Hygrometer, recording, 109

IMPERIAL CHEMICAL INDUSTRIES, LTD., annual review, 152

India, oil and natural gas, 411
Infra-red detector, 183
Inorganic polymers, heat-resistant, 41
Institution of Chemical Engineers, 151
Instrumentation training unit, 252
Instruments, control, *see* 'Automatic Control'
Instruments, industrial, availability, 3
Insulating materials, thermal conductivity, 229
Insulation, 180
Insulation for pipes, 220
Ion-exchange:
effluent treatment, 201
developments, review, 352-354
in gelatine production, 3
Ireland, fertiliser industry, 382
Iron and steel industry:
ingot moulds, cooling, 381
iron ore, fluidised-bed reduction, 335
New Zealand ironsands, 300
pig iron from scrap, 416
sponge iron, Mexican process, 154
Iron oxide, purification, 14
Israel, chemical expansion, 379

JERRICAN pourer, 32

KIESELGUHR for filtration, 180
Krypton, clathrate of, 301

LABOUR, cost of, 176

Lactic acid purification, 235
Latex foam, dispersions for, 54
Lead:
alloys for accumulators, 37
brick, 323
cemented alloys, 235
'Least squares' calculations, 439
Level control:
battery-operated, 66
bottle holder, 110
equipment, 181
gamma ray, 159-161
level measurement, electronic, 157
ultra-sensitive gauge, 382
Lift truck, hydraulic, 112
Lifter, 325
Lighting fittings, 4
Liquid-liquid extraction, agitation research, 43
Literature, scientific:
central library, U.K., 62
industry's neglect, 187
Loading:
attachment for lorries, 179
and off-loading machine, 325
Low temperatures, liquid helium, 297
Lubricants, dry, aerosols for, 110

MAGNESIA, sintered, 189

Magnesium alloy, new, 190
Maintenance, plant, cost of, 176
Maleic anhydride:
fluid-bed production of, 260
project, 75
Manganese:
fluidised-bed production, 337
process, 74
world developments, 415
Manufacturing-cost estimating, 175-178
Mass spectrometer, 325
Mass transfer:
in distillation, panel's report, 211
in nuclear reactors, 350

Mass transfer (*cont'd.*):
rate functions, 208
research, D.S.I.R., 245

Materials handling:
acid, automatic control, 399
dangerous, atomic energy, 312
feeder, rotary paddle, 70
feeder rotary shaft, 69
hopper replenishment, electric control, 325
pneumatic transport, 241-244, 320-322
polythene trolley, 374
remote-control, 266
vehicles and equipment, 374

Mechanical power from vaporising liquid gas, 116

Mechanical seals, 120
Mechanical seals, heat-resistant seats, 285
Mechanical shovel, backhoe attachment, 182
Meehanite metal, 130-131
Mercury collector, 66
Metallic surfaces, treatment of, 215

Metals:
See also under names of various metals
bonded sheet steel, 183
chemicals, U.S. company's production, 102
descaling, 189
embrittlement, 346
ion-exchange separation, 353
lead-cemented alloys, 235
low-carbon Mn-Cr-Mo-V steel, 132-136

Meehanite in chemical plant, 130-131
Methanol project, South Africa, 35
Microbiology, applied, 1
Microscope in particle size analysis, 383

Minerals:
processing research, 246
separating equipment, 219

Mixers:
batch, compact, 113
bearings, spacing of, 129
clamp-mounted, 48
cube-shaped, 48
developments, review of, 43-46
disintegrating and mixing minute quantities, 324
double-cone, 50
double-worm, 52
drier-pulveriser as mixer, 48
dry powders, 46
emulsifier-disperser, 220
epicycle-movement, 50
heating pans with agitation, 48
high-viscosity, 47
homogeniser-emulsifier, 26
homogeniser for laboratory and pilot plant, 283
immersion mixer-emulsifier, 50
in pipeline, 47
laboratory general-purpose, 436
plastics and resins, 49
portable high-speed, 51
shakers and blenders, 52
shortcomings of, 117
side-entry, 47
spiral-bevel agitator drives, 111
stirrer, fine control, 374
testing, dry solids, 53-54, 174 (*correspondence*)
ultrasonic, 54-57
V-shaped, 183
vertical, extra large, 51
with heat exchanger, 49
Y-cone, 50

Molecular sieves, 30
Molybdenum trichlorides and tetrachlorides, 224
Montecatini, 226

NATIONAL CHEMICAL LABORATORY, 217
research report, 427

Natural gas:
ammonia synthesis gas from, 413
chemicals from, 377
Indian resources, control, 411
liquid, British experiment, 80
steam methane reformer, 333
Neutron source storage, 284

New Zealand:
calcium carbide, 71-73, 152
chemical industry, 80
fuel industries, 72
ironsands exploitation, 300
power resources, 71

Nickel:
alloy in mixer turbines (U.S.), 30
industry, production capacity, 64
refinery, electrolytic, 227

Nitrogen:
German industry, 106
liquid, generator, 326
world production, 153

Nitrogen peroxide recovery, 12

Nitroglycerine:
manufacture, 22-23
production, centrifuges in, 90

NOMOGRAMS:
convection and radiation coefficients for air films, 33
heating and cooling of gases flowing normal to staggered tubes, 371
heating and cooling of gases in tubes, 407
heat-transfer coefficients for condensing steam, 329
heat transfer to externally heated beds of glass beads fluidised with air, 63
heat transfer to internally heated beds of glass beads fluidised with air, 105
linear velocity of air in ducts, 255
specific heats of organic liquids, 293
thermal conductivity of insulating materials, 229

Non-Newtonian fluids, 45, 115
Norsk Hydro, 192

OILS and fats, centrifuge developments, 88
Olefin emulsions, 56
Olin Mathieson chemical projects, 337
Ovens, large-capacity, 374
Oxygen analysers, magnetic, 181

PACKAGING:
bulk containers, review, 277-278
corrosive chemicals, 274-276
drum printing, 276
paper bags for semi-liquids, 278

Paint, saving, 326

Paints, *see* 'Coatings'

Pallet for bottles, 221

Paper industry:
Belgian project, 258
cellulose factory, automatic control, 165
chemical pulp from eucalyptus, 297
board, polythene-coated, 102
hemicellulose degradation, 346
effluents, 197
high-efficiency pulping plant, 235
stock preparation, automatic control, 166
Swedish pulp drier, 416
Particle size analysis, 383-386
Penicillin, isolation of molecule, 118
Petroleum:
catalyst carrier, 286
chemicals:
Australian industry, 79
Canadian production, 396
European industry, 234
Fawley plant, 19-21
Italian project, 377
Shell's Carrington project, 104
Wilton olefine plant, 343

Petroleum (contd.):

- Indian resources, control, 411
- mineral oil emulsions, 55
- refineries:
 - Coryton, 2, 34
 - Fawley, 101
 - Kent, 107
 - Shell Haven, 80, 257
 - Stanlow, *Udex* plant, 148
 - Whitegate, Ireland, 382, 405
- Pfizer Ltd., pilot plants, 409
- pH meter, miniature, 375
- Pharmaceutical factory, Holland, 411
- Phosphoric acid, Southern Rhodesia, 77
- Phosphorus factory, Israel, 77
- Photographic film, waste, 344
- Pickle liquor waste, 81
- Pickling baths, acid inhibitors for, 114
- Pigments, dispersions of, 55

Pipes:

- buried, protection of, 216
- ceramic, 215
- couple, 182
- couplings, flexible, 31
- effluent, 202, 312 (*Correspondence*)
- end stopper, 182
- fittings, 30, 67, 286
- high-impact PVC, 67
- impervious graphite, 286
- manufacture, automatic, 436
- plastic, for effluents, 402
- pneumatic transport systems, 322
- PTFE, 418
- support hangers, 137

Plastics:

- See also names of various plastics*
- Canadian production, 396
- chemically inert, 401
- containers, 275
- for chemical plant, review, 123-126
- high-impact rigid PVC, 41
- inorganic polymers, 41
- drums and containers, 277-278
- fluorocarbon TFE resin, 437
- linings and coatings, 216
- pipes for effluents, 402
- pipes, reinforced epoxide, 402
- polyester resin, 324
- Polypenco* thermoplastic, 401
- PTFE pipes, 418
- storage tank material, 66
- Terylene* and glass-reinforced plastics, 236
- thermoplastic resin, 220
- waste reprocessing, 325

Plutonium:

- plant, safety in, 279-281
- separation processes, development of, 271-273

Pneumatic control, 402

- Pneumatic transport theory and design, 241-244, 320-322

Polarographs, 70, 286

Polymerisation:

- styrene, 153
- process improvement, 189

Polymers, *see* 'Plastics'

Polythene:

- Belgian project, 75
- coating for corrugated board, 102
- high-density, production, 74
- Indian production, 231
- low-pressure, 276
- uses in chemical industry, 124

Polyvinyl chloride in chemical plant, 123

Porcelain, high-duty, 215

Powder filling machine, 403

Pressure:

- controlled electrical unit, 325
- controller, 65
- gauges, labelling and calibrating, 40
- ventilated suit, 220
- vessels:
 - fabricating shops, new, 282
 - low-carbon steel, 132-136

Pressure (contd.):

- vessels:
 - standard, 3
- Printing on packages, 276
- Process operators, training, 192
- Project:
 - engineering, 355-358
 - evaluation, estimating for, 175-178
 - organisation, 358-362
- Propane-fuelled stacker, 400
- Proportioning, off-weight indicator, 286
- Propylene, oxidation of, 153
- Protection against gamma, beta and alpha rays, 323
- Pulp mill, new Swedish, 77
- Pumps:

- canned-motor, 253, test loop for, 438
- centrifugal, 25, 137, 286, 399
- chemical, general review, 119-122
- gland for, 221
- gland packing, 283
- glandless, 120
- high-vacuum rotary-piston, 111
- hydraulic pressure, 141
- hydraulic, variable-flow, 400
- lightweight, 220
- mechanical seals, 120, 285
- metering, 30, 252
- paraffin wax, 142
- Pathfinder*, 253
- Pneumo* air-operated, 25
- pressure controlled by hand, 284
- process, 140
- salt, 331
- seals, abrasion-resistant, 30
- silent, dry suction, 143
- stainless-steel, *Puma*, 402
- stuffing boxes for, 120
- vacuum, 140, 251
- variable flow, 400
- vertical, effluent, 109
- vertical, glandless, 179
- viscous fluids, 437

Pyrrhotite, nickel recovery from, 335

QUALITY-CONTROL:

- equipment, 30
- problems, 82

RADIOACTIVITY monitor, 374

Radioactivity tester, rapid, 432

Radio-assay of non-active gases, 287

Research:

- industrial, problems of, 39
- scientific, the individual and, 262

Resins, *see* 'Plastics' and 'Ion Exchange'

Rheology, 115

Royal Institute of Chemistry examinations, 381

Rubber:

- bonding agent for glass lining, 82
- ebonite linings, 215
- from scrap tyres, 344
- lining, technical panel, 62
- to metal, bonding, 38

Rubber, synthetic:

- Butakon*, 331
- conveyor drying of, 205-206
- elastomers laboratory, 194
- from turpentine, 380
- Italian industry, 64
- Socabutyl*, 331

Russian literature, translating, 81

SACKS, paper and jute, 275

Safety:

- Chief Inspector of Factories report, 262
- explosion protection, 83-85
- gamma radiation, 160
- plutonium plant, 279-281

Salon de la Chimie, review of, 330-332

Sampling accessories, ultra-micro, 183

Science:

- graduates, industrial employment scheme, 345
- humanitarian aspects, 261
- jargon, commentary, 301
- policy, national, in U.K., 191
- research, the individual and, 262

Screening machine, 113

Sea-water, demineralisation, *see* 'Water'

Sedimentation, particle size analysis, 384

Separator:

- and classifier, densimetric, 401
- magnetic, 373

Shaker apparatus, laboratory, 402

Shale, chemicals from, 257

Shot-blast machines, 138

Siever and strainer, 65

Silica filaments, 331

Silicon, high-quality, 104

Silicon nitride, high-temperature material, 381

Silk screening, 152

Size reduction:

- ball mill, vibratory, 182
- colloid mills, 330
- developments, review, 423-426
- grinder for specimens, 399
- grinding mill, high-speed, 183
- grinding mill, small production, 30
- gyratory crushers, 221
- Vibro-Energy* mill, 416

Slime control in paper mills, 375

Sludge disposal, 196, 417

Smoke eliminators, 141

Society of Chemical Industry, Heavy

Organic Chemicals Group, 371

Sodium:

- as nuclear reactor coolant, 347-351
- melting station, 225

Sodium chlorate plant, U.S.A., 103

Sodium chlorite product for slime control, 375

Sodium sulphite liquor, causticisation of, 268-270

Sodium thiosulphate, production, 419-422

Sodium tripolyphosphate in synthetic detergents, 225

Solvent extraction:

- lactic acid purification, 235
- plutonium, 272
- uranium, 172

Soups, ultrasonic homogenisation, 56

Specific gravity indicator, 326

Spectrometry, 286

Spectrophotometer, flame, 28

Sponge iron process, 154

Spray nozzles, 326, 392

Stacking machine, gas-fuelled, 400

Standards, engineering, 417

Starch:

- separating gluten from, 90
- ultrasonic homogenisation, 55

Steel, *see* 'Metals'

Still, pure platinum, 220

Stoneware, industrial, 215

Stainer, suction, 180

Sugar:

- liquors, waste, treatment, 201
- production, centrifuging in, 88

Sulphate of ammonia, *see* 'Ammonium sulphate'

Sulphur dioxide recovery, 11

Sulphur removal, gasworks projects, 314

Sulphuric acid:

- coolers, 435
- from petroleum, Australia, 107
- manufacture, history of, 2
- plant, U.K., 250
- plant, Holland, 257
- sulphur dioxide from, 166
- Whitehaven expansion, 75

Sweden, atomic power projects, 377, 411

Synthetic fibre, *Terlenka*, 35

18
i.p.c.

TALL oil, estimation in kraft black liquor, 286

Tanks:

acid, repair of, 142
pickling, mild-steel, 182
Tannin extraction process, 297
Tar distillation, continuous, 239
Television, closed-circuit, 369

Temperature control:

electronic thermo-switch, 29
equipment, 27
furnaces, 220
hot-weather, 112
indicating, 110
measurement, electronic, 70
thermocouple, 286

Terephthalic acid, Japanese plant, 77

Thermocouple, 286

Thermometer, dial, 29

Thermostat, 183

Thickness measuring instrument, 112

Thorium, Canadian plant, 233

Timer, two-way drive, 66

Titanium:

anodes, 403
corrosion tests in catalytic reformer, 344
electrodes, electro-chemical, 41
platinised, in cathodic protection, 403
pressure vessel, 344

Titanium dioxide, Mexican project, 341

Titration, automatic, 68

Trucks, hand, 68

Tubes, squeeze-clamp, 27

Tube benders, hydraulic two-stage, 31

Tunnel kiln, new, 435

ULTRASONIC:

emulsification and dispersion, 54-57
flowmeters, 93

Uranium:

depleted, in U.S.A., 224
from plutonium and fission products, 189
ion-exchange extraction, 353
isotopes, gaseous, centrifugal enrichment, 89
processing at Springfields, 39, 172-174
production of, 114
South Africa, 441

Urea, see 'Fertilisers'

U.S.A.:

atomic energy programme, 380
inflationary trend, 144
overseas investments, 438

U.S.S.R.:

chemical expansion, 411
co-operative research, 415
'inventions' competition, 235
machinery imports, 79

Utilities, cost of, 175

VALVES:

automatic return, 137
butterfly, heavy-duty, 31
changeover control, 373
control, 181
diaphragm, 138
electronic control of, 322
fine adjustment, plastic, 25
full-way gas/liquid, 28
gate, 251
hydraulic operation of, 29
lubrication eliminated, 403
parallel slide, 26
piped solids control, 138
plastic, wedge-gate, 436
plug, PTFE-sleeved, 403
pressure-reducing, 283
PTFE-sleeved plug, 137
rubber, 216
selector, gas and liquid, 400

Valves (contd.):

semi-balanced globe, 67
solenoid, 251
steam/water mixing, 26
stroking speed increased, 283
telescopic, 403
Vanadium alloys, improved, 74
Vaporising liquids, pumping, 122
Variable-speed drive, 326
Vats, polythene, 111
Vessels, glass-lined, acid-resistant, 181
Ventilator, 143
Vibratory debunkering, 252
Vinyl sheet, bonding glass-fibre to, 324
Viscometer, 66
Viscous liquids, research, 115

WARREN SPRING LABORATORY, 245-246

Waste:

products, recovery of, 201
treatment, see 'Effluent treatment'

Water:

boiler feedwater treatment, 74
chlorinator, 69

Water (contd.):

deioniser, 182, 400
demineralisation:
chemical process, 42
electrodialysis plant, U.S.A., 30
forced-recirculation vapour-compression, 337
laboratory unit, 31
licence agreement, 75
ion-exchange treatment, 354
Wax emulsions, 56
Weighing indicator, proportioning, 286
Welding:
large fabrications, 30
fabrication shops' facilities, 282
low-carbon steel, 134
torch, 143
trends, 81
Wood, chemical modification of, 236

X-RAY absorption, 225

ZINC ores, fluid-bed roasting of, 37
Zirconium and alloys, 313-316, 363-368

AUTHOR INDEX

Bainbridge, C. A., 'New Approach to Wet Washing of Industrial Gases,' 8

Bannister, H.:

'Testing Dry Solids Mixers,' 53
'Theory and Design of Pneumatic Transport Systems,' Part 1, 241; Part 2, 320

Baxter, J. P., 'Nuclear Energy in Australia,' 327

Broadwell, E., 'Centrifuging,' 86

Bulmer, C. H., 'Packaging Corrosive Chemicals,' 274

Butcher, K. L., 'A Self-acting Automatic Flow Controller,' 99

Calus, W. F., 'Drying,' 391

Cawthorne, C. W., 'Electronic Process Control—Advantages and Scope,' 155

Chleck, D. J., 'Radio-assay of Non-active Gases,' 287

Cohen, L., 'Particle Size Analysis for the Chemical Engineer,' 383

Collins, J. H., 'Plastics for Chemical Plant,' 123

Cran, J. E., 'Estimating Manufacturing Costs for Project Evaluation,' 175

Damon, W. A., 'Dealing with Noxious Gases,' 11

Davis, D. S., see 'Nomograms'

Donaldson, E. G., 'Meehanite in Chemical Plant,' 130

Dykes, C. H., 'Modern Methods of Waste Treatment,' 200

Eifert, G., 'Automatic Control of Effluent Neutralisation,' 198

Field, J. A., 'Performance Characteristics of Intalox Saddles,' 310

Fletcher, W., 'Co-ordination of Effort in Planning and Erection,' 360

Genge, J. A. R., 'Ion Exchange,' 352

Grover, J. R., 'Fixation of Fission Product Wastes for Ultimate Disposal,' 263

Hagyard, T., 'Can Calcium Carbide be Made in New Zealand?' 71

Harbourne, B. L., 'Sodium—Reactor Coolant,' 347

Harries, D. R., 'The Technology of Zirconium and Its Alloys,' Part 1, 313; Part 2, 363

Hilliard, A., 'Graphite as a Material of Construction for Heat Exchangers,' 127

Holden, A. H., 'Prepared Atmospheres in the Chemical Industry,' 388

Hurley, S. T., 'Packaging Corrosive Chemicals,' 274

Jones, H. H. M., 'Fractional Distillation,' Part 1, 168; Part 2, 207

Kelly, W. V. M., 'Project Engineering,' 355

Lowden, N. H., 'Level Control by Gamma Rays,' 159

Mackenzie, I. M., 'Low-carbon Mn-Cr-Mo-V Steel for Pressure Vessels,' 132

Maisey, H. R., 'Explosion Protection in Industry,' 83

Molyneux, F.:

'The Causticisation of Sodium Sulphite Liquor,' 268

'Economic Production of Sodium Thiosulphate,' 419

Paulsen, F. R., 'The Development of Plutonium Separation Processes,' 271

Porter, K. E., 'How Random is Random Packing?', 303

Randall, D. G., 'Selection of Tower Packings and Accessories,' 306

Reece, M. C., 'Cutting the Cost of Heavy Water,' 16

Riester, W. F., 'Chemical Pumps,' 119

Riley, D. F., 'Progress Report on Agitation,' 43

Riley, R. V., 'Size Reduction,' 423

Roberts, F.:

'The Chemical Engineer in Charge of a Development Section,' 237

'Organisation of Chemical Plant Projects,' 358

Rutherford, R., 'Variable-area Flow Meters,' 94

Smith, C. J., 'Planning for Effluent Treatment,' 195

Smith, J. S., 'Emulsification and Dispersion Using Ultrasonics,' 54

Smith, P. B., 'Modern Methods of Waste Treatment,' 200

Stewart, R. F., 'Planning for Effluent Treatment,' 195

Stoll, H. W., 'Pneumatic Control Techniques and their Effects on Stability,' 162

Terrett, D. S., 'Chemical Process Design of an Analogue Computer,' 58

Wansbrough-Jones, Sir Owen, 'Reducing the Cost of Corrosion,' 214

Ziegler, C. A., 'Radio-assay of Non-active Gases,' 287

